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(54) **SERVICE RECOMMENDATION METHOD, APPARATUS AND DEVICE**

(57) Embodiments of the present specification provide a service recommendation method, apparatus, and device. In the method, a recommendation scheme model may be pre-configured, and by acquiring a user feature of a target user, a use feature of the target user for a service, and a service feature of the service currently used by the target user, a paid service recommendation scheme for the target user can be output; therefore, a paid service that meets requirements of the target user can be input to implement dynamic recommendation of the paid service, and the recommendation accuracy is high.

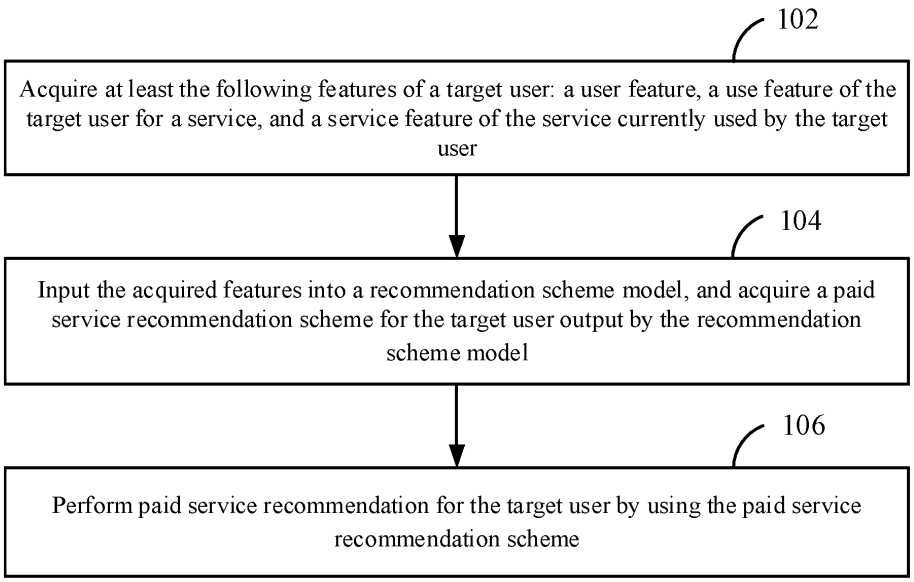

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present specification relates to the field of Internet technologies, and relates, in particular, to a service recommendation method, apparatus, and device.

BACKGROUND

[0002] With the rapid development of Internet technologies, there are more and more Internet products, bringing a lot of convenience to users. Some products such as a network cloud disk usually have free services and one or a plurality of paid services. Functional interfaces of these products usually provide paid service entrances for recommending paid services to users. Based on this, it is necessary to provide a service recommendation scheme with a higher accuracy.

SUMMARY

[0003] In order to overcome the problems in the related technologies, the present specification provides a data recommendation method, apparatus, and device.

[0004] In the first aspect according to embodiments of the present specification, a service recommendation method is provided, comprising:

acquiring the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;

inputting the acquired features into a recommendation scheme model, and acquiring a paid service recommendation scheme for the target user output by the recommendation scheme model; and

performing paid service recommendation for the target user by using the paid service recommendation scheme.

[0005] Optionally, performing paid service recommendation for the target user comprises:

outputting a paid recommendation entrance on a page where the target user uses the service.

[0006] Optionally, the use feature comprises one or a plurality of the following:

a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature.

[0007] Optionally, the service feature comprises one or a plurality of the following:

a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

[0008] Optionally, the paid service recommendation scheme comprises one or a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location.

[0009] In the second aspect according to the embodiments of the present specification, a service recommendation apparatus is provided, comprising:

a feature acquisition module configured to acquire a user feature of a target user and a use feature of the target user for a service;

a scheme acquisition module configured to call a recommendation scheme model by using the user feature and the use feature as inputs, and acquire a paid service recommendation scheme output by the recommendation scheme model; wherein the recommendation scheme model is obtained by training in advance using user data, historical use data of the user for services, and difference feature data of a free service and a paid service; and

a recommendation module configured to perform paid service recommendation for the target user by using the paid service recommendation scheme.

[0010] Optionally, the recommendation module is specifically configured to:

output a paid recommendation entrance on a page where the target user uses the service.

[0011] Optionally, the use feature comprises one or a plurality of the following:

a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature.

[0012] Optionally, the service feature comprises one or a plurality of the following:

a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

[0013] Optionally, the paid service recommendation scheme comprises one or a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location.

[0014] In the third aspect according to the embodiments of the present specification, a service recommendation device is provided, comprising a memory, a processor, and a computer program stored in the memory and executable by the processor, wherein the processor executes the program to implement the following method:

acquiring the following features of a target user: a user feature, a use feature of the target user for a

service, and a service feature of the service currently used by the target user;

inputting the acquired features into a recommendation scheme model, and acquiring a paid service recommendation scheme for the target user output by the recommendation scheme model; and

performing paid service recommendation for the target user by using the paid service recommendation scheme.

[0015] The technical schemes provided by the embodiments of the present specification may include the following beneficial effects:

[0016] In the embodiments of the present specification, a recommendation scheme model may be pre-configured, and by acquiring a user feature of a target user, a use feature of the target user for a service, and a service feature of the service currently used by the target user, a paid service recommendation scheme for the target user can be output; therefore, a paid service that meets requirements of the target user can be input to implement dynamic recommendation of the paid service, and the recommendation accuracy is high.

[0017] It should be understood that the above general description and the following detailed description are only exemplary and explanatory, and should not limit the present specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Accompanying drawings here, showing the embodiments conforming to the present specification, are incorporated into the specification and constitute a part of the present specification, and are used to explain principles of the present specification together with the specification.

FIG. 1 is a flowchart of a service recommendation method shown according to an exemplary embodiment of the present specification.

FIG. 2 is an application scenario diagram of a method shown according to an exemplary embodiment of the present specification.

FIG. 3 is a hardware structure diagram of a computer device where a service recommendation apparatus according to an embodiment of the present specification is located.

FIG. 4 is a block diagram of a service recommendation apparatus according to an exemplary embodiment of the present specification.

DETAILED DESCRIPTION

[0019] Here, exemplary embodiments will be described in detail, and examples thereof are shown in the accompanying drawings. When the following description involves the accompanying drawings, the same numbers in different accompanying drawings indicate the same or similar elements, unless otherwise indicated. The implementations described in the following exemplary embodiments do not represent all implementations consistent with the present specification. In contrast, they are merely examples of apparatuses and methods consistent with some aspects of the present specification as detailed in the appended claims.

[0020] Terms used in the present specification are only for the purpose of describing specific embodiments, and are not intended to limit the present specification. The singular forms "a," "the," and "said" used in the present specification and appended claims are also intended to include plural forms, unless the context clearly indicates other meanings. It should also be understood that the term "and/or" used herein refers to and includes any or all possible combinations of one or a plurality of associated listed items.

[0021] It should be understood that although terms such as first, second, and third may be used in the present specification to describe various types of information, the information should not be limited to these terms. These terms are only used to distinguish the same type of information from each other. For example, without departing from the scope of the present specification, the first information may also be referred to as second information, and similarly, the second information may also be referred to as first information. Depending on the context, for example, the word "if' as used here may be interpreted as "when" or "at the moment that..." or "in response to determination."

[0022] At present, types of Internet products and services provided are increasingly diversified. Taking network cloud disk products as an example, such products usually have free services and one or a plurality of paid services, and users can select services that suit their own needs. Such products may recommend paid services to users. An idea of implementing service recommendation is providing a fixed paid service entrance in a functional interface of a product. This manner may be ignored by users, resulting in a poor service recommendation effect and low recommendation accuracy.

[0023] The embodiments of the present specification provide a service recommendation method, and a paid service can be accurately recommended to a user according to the method. Referring to FIG. 1, part of the process of the method may include the following steps:

[0024] In step 102, the following features of a target user are acquired: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user.

[0025] In step 104, the acquired features are input into a recommendation scheme model, and a paid service recommendation scheme for the target user output by the recommendation scheme model is acquired.

[0026] In step 106, paid service recommendation is performed on the target user by using the paid service recommendation scheme.

[0027] In the method of the embodiment of the present

specification, a servicer of an Internet product may provide a client to users. In some examples, the method of the embodiment of the present specification can be applied to the client, and the client acquires the paid service recommendation scheme and performs recommendation. In other examples, it may also be applied to a server corresponding to the client. After the user logs in to the server by using the client, the server acquires the paid service recommendation scheme and performs recommendation by using the client.

[0028] In the embodiment of the present application, a recommendation scheme model may be pre-trained, and the recommendation scheme model may be pre-set in the client or set in the server. In some examples, the recommendation scheme model may be pre-trained by the servicer, and the trained recommendation scheme model may be configured in the client for service recommendation. For example, when service recommendation is required, the server can acquire the paid service recommendation scheme and then return it to the client, and the service recommendation is performed by using the client. Or, the client can directly acquire the paid service recommendation scheme by using the recommendation scheme model, and directly perform paid service recommendation in the present client.

[0029] Next, the recommendation scheme model is described. In the present embodiment, the servicer may prepare sample data used for training in advance. The sample data includes at least user data, historical use data of users for services, and feature data of various types of services.

[0030] Wherein, the user data may indicate personal information, registration information, identity information, or the like of users. For example, a user may be required to fill in registration information after the user registers for an account, and the user data may be acquired based on the data submitted after the user fills in the registration information, or the user data may be acquired continuously in the process of the user using the service.

[0031] The historical use data of users for services may be collected through the client. For example, the client may collect, within a certain period of time, use data generated by a plurality of users in the process of using services at the client, and the client may send the collected use data to the server. The historical use data of users for services here includes use data of the users for free services and use data for various types of paid services. Specifically, the use data may include one or a plurality of types of the following data: use time period data, use duration data, use frequency data, used storage space data, used storage quantity data, or the like. Acquiring the historical use data may be used for a plurality of purposes, such as determining use habits of users for services, determining characteristics of users who use free services, determining characteristics of using paid services, determining characteristics of users who change from using free services to paid services, and the like.

[0032] In the present embodiment, service data of free services and service data of paid services may also be acquired to determine the difference between the free service and the paid service. In practical applications, it can be flexibly configured according to the applied scenario, and the service data can be configured by the technical staff of the service provider. Taking the network cloud disk as an example, the service data of free services and the service data of paid services may include storage space difference data, folder quantity difference data, function type difference data, storage quantity difference data, and total storage quantity difference data, computation unit peak value difference data, total computation amount difference data, network download speed difference data, network upload speed difference data, total network download amount difference data, or total network upload amount difference data.

[0033] Generally, the sample data needs to reach a certain quantity to ensure the accuracy of the trained model, and more sample data may result in a higher accuracy of the model. On the other hand, when the recommendation scheme model is trained and applied, the recommendation scheme model can be used to acquire a paid service recommendation scheme of the target user to perform recommendation. The client can acquire a feedback result (such as whether to select the recommended paid service) of the target user after the recommendation. After the model is put into application, the feedback result and other user data received by the client may also be used as samples, thus implementing continuous training and optimization of the recommendation scheme model.

[0034] After the above sample data is prepared, the recommendation scheme model can be obtained by training a machine learning model using the sample data. In the training process, training a suitable model with a high accuracy needs to depend on feature selection and model selection. Wherein, the machine learning model may include a logistic regression model, a random forest model, a Bayesian method model, a support vector machine model, a neural network model, or the like. The model selection affects the accuracy of a final recognition model obtained by training. Therefore, a variety of models can be selected for training in the actual application. The training process is relatively time-consuming, and requires complex iterations, and constant trial-and-error and repetition.

[0035] Another aspect of the training process is the selection of appropriate features. The features determined in the present embodiment may include the user feature, the use feature of the target user for the service, and the service feature of the service currently used by the target user.

[0036] Specifically, the user feature may include: a personal feature, identity feature, or the like of the user, such as age, gender, education level, profession, industry, work unit, whether the work unit is an enterprise user, or the like. The above user feature may indicate a preference or requirement of the user for a paid service, and

therefore the preference or requirement of the user for a paid service can be through the user feature. For example, a user of a certain profession may need to use a larger storage space and have a greater preference for a paid service; or, an older user may have less preference for a paid service, etc. The user feature can be used to predict, to a certain extent, the preference or requirement of the user for a paid service.

[0037] The use feature includes one or a plurality of the following: a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature. The above use feature may be determined by the client or server by continuously collecting data of the user using the service. The above use feature may also indicate a requirement of a user for a paid service. For example, a user with a higher use frequency is more likely to require various types of paid services, a user who uses more storage space is more likely to require upgrading paid services, and the like. The user feature can be used to predict, to a certain extent, the preference or requirement of the user for a paid service.

[0038] In the present embodiment, the service feature of the service currently used by the target user includes one or a plurality of the following: a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

[0039] Through the above method, the service provider prepares the sample data, selects the target feature and model, and then pre-trains the recommendation scheme model. After the training of the recommendation scheme model is completed, the recommendation scheme model may be configured in an electronic device or it may also be configured in the server, and the paid service recommendation scheme of the target user can be acquired when needed.

[0040] The specific process of acquiring a paid service recommendation scheme may be acquiring the user feature of the target user and the use feature of the target user for the service and inputting them into the recommendation scheme model, and using the model to output a paid service recommendation scheme matching the target user. It can be understood that the type of features input when acquiring the paid service recommendation scheme may be roughly the same as the type of features used in the training process. Optionally, the paid service recommendation scheme includes one or a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location. Wherein, the paid service type in the paid service recommendation scheme indicates one or a plurality of several types of paid services provided by the service provider; the recommendation frequency indicates a frequency of recommending the paid service scheme, for example, recommending once every time the user opens a page, or recommending once a day, or recommending once after a certain time interval, or the like; the recommendation time indicates a time period or moment when the paid service scheme is recommended to the user, and the recommendation time may be a time that does not affect the user using of the service, etc.; and the recommendation location may be one or a plurality of pages among several pages provided by the service provider, or it may also be a specific location of a specific page, such that the user can check the paid service recommendation scheme in time. With the above information, service recommendation can be performed dynamically. For example, a paid recommendation entrance can be output on the page where the target user uses the service, such that the recommended paid service meets the preference and requirement of the user.

[0041] As shown in FIG. 2, a schematic diagram of an interface for service recommendation according to an exemplary embodiment of the present specification is shown. In FIG. 2, a knowledge base service product is used as an example, the product provides a user with services such as a network cloud disk and file sharing, and the user can upload files and store them in a network storage space provided by the service provider. The knowledge base service product can apply the service recommendation scheme of the present embodiment. In the process of the user using the service, by a user feature, a use feature of a target user for a service (such as the current size of a storage space that has been used by the user, the quantity of uploaded files, or the quantity of established folders), and a service feature of the service currently used by the target user (such as the user currently using a free service), then inputting the acquired features into a recommendation scheme model, a paid service recommendation scheme for the target user output by the recommendation scheme model is acquired, and by using the paid service recommendation scheme, a paid recommendation entrance may be dynamically output on a page where the target user uses the service. Specifically, a paid recommendation entrance in the embodiment shown in FIG. 2 is a rectangular box of "Upgrade to a Pro user and enjoy more knowledge bases," and the user can trigger the paid recommendation entrance to enter a paid service purchase page.

[0042] As can be seen from the above embodiment, in the present embodiment, a recommendation scheme model may be pre-configured, and by acquiring a user feature of a target user, a use feature of the target user for a service, and a service feature of the service currently used by the target user, a paid service recommendation scheme for the target user can be output; therefore, a paid service that meets the requirement of the target user can be input to implement dynamic recommendation of the paid service, and the recommendation accuracy is high.

[0043] Corresponding to the foregoing embodiment of

the service recommendation method, the present specification further provides an embodiment of a service recommendation apparatus and a device to which it is applied.

[0044] The embodiment of the service recommendation apparatus in the present specification can be applied to a computer device, such as a server or a terminal device. The apparatus embodiment can be implemented by software, or can be implemented by hardware or a combination of software and hardware. A software implementation is used as an example, and as an apparatus in a logical sense, it is formed by reading corresponding computer program instructions in a non-volatile memory into a memory by a processor for processing files where it is located. From a hardware perspective, as shown in FIG. 3, a hardware structure diagram of a computer device where the service recommendation apparatus according to an embodiment of the present specification is located is shown. In addition to a processor 310, a memory 330, a network interface 320, and a non-volatile memory 340 shown in FIG. 3, a server or an electronic device where the apparatus 331 in the embodiment is located may also include other hardware generally according to actual functions of the computer device, which will not be repeated here.

[0045] As shown in FIG. 4, FIG. 4 is a block diagram of a service recommendation apparatus according to an exemplary embodiment of the present specification, and the apparatus includes:

a feature acquisition module 41 configured to acquire the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;

a scheme acquisition module 42 configured to input the acquired features into a recommendation scheme model, and acquire a paid service recommendation scheme for the target user output by the recommendation scheme model; and

a recommendation module 43 configured to perform paid service recommendation for the target user by using the paid service recommendation scheme.

[0046] Optionally, the recommendation module is specifically configured to:

output a paid recommendation entrance on a page where the target user uses the service.

[0047] Optionally, the use feature includes one or a plurality of the following:

a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature.

[0048] Optionally, the service feature includes one or a plurality of the following:

a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

[0049] Optionally, the paid service recommendation scheme includes one or a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location.

[0050] Correspondingly, the present specification further provides a service recommendation device, including a memory, a processor, and a computer program stored in the memory and executable by the processor, wherein the processor executes the program to implement the following method:

acquiring the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;

inputting the acquired features into a recommendation scheme model, and acquiring a paid service recommendation scheme for the target user output by the recommendation scheme model; and

performing paid service recommendation for the target user by using the paid service recommendation scheme.

[0051] For the implementation processes of the functions and roles of various modules in the above service recommendation apparatus, reference may be made to the implementation processes of the corresponding steps in the above service recommendation method, which will not be repeated here.

[0052] The apparatus embodiment is basically corresponding to the method embodiment, and therefore, for related parts, reference may be made to the part of the description of the method embodiment. The apparatus embodiment described above is only illustrative. The modules described as separate components may or may not be physically separated, and the components displayed as modules may or may not be physical modules, that is, they may be located in the same place, or they may be distributed to a plurality of network modules. Some or all of the modules may be selected according to actual needs to achieve the objective of the scheme in the present specification. Those of ordinary skill in the art can understand and implement it without creative efforts.

[0053] The foregoing describes specific embodiments of the present application. Other embodiments fall within the scope of the appended claims. In some cases, the actions or steps recited in the claims may be performed in a sequence different from the order in the embodiments and may still achieve the desired result. Further, the processes depicted in the drawings do not necessarily require the particular order or sequential order shown to achieve the desired result. In certain implementations, multitask-

ing and parallel processing is or may be advantageous.

[0054] Those skilled in the art will easily think of other implementations of the present specification after considering the specification and practicing the invention applied here. The present specification is intended to cover any variations, uses, or adaptive changes of the present specification, and the variations, uses, or adaptive changes follow the general principles of the present specification and include common knowledge or customary technical means in the technical field not applied for in the present specification. The specification and the embodiments are only regarded as exemplary, and the true scope and spirit of the present specification are pointed out by the following claims.

[0055] It should be understood that the present specification is not limited to the precise structure described above and shown in the accompanying drawings, and various modifications and changes can be made without departing from its scope. The scope of the present specification is only limited by the appended claims.

[0056] The above descriptions are only the preferred embodiments of the present specification, and are not intended to limit the present specification. Any modification, equivalent replacement, improvement, and the like made within the spirit and principle of the present specification shall fall within the protection scope of the present specification.

Claims

1. A service recommendation method, comprising:

   acquiring at least the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;
   inputting the acquired features into a recommendation scheme model, and acquiring a paid service recommendation scheme for the target user output by the recommendation scheme model; and
   performing paid service recommendation for the target user by using the paid service recommendation scheme.

2. The method according to claim 1, wherein performing paid service recommendation for the target user comprises:
   outputting a paid recommendation entrance on a page where the target user uses the service.

3. The method according to claim 1, wherein the use feature comprises one or a plurality of the following:
   a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature.

4. The method according to claim 1, wherein the service feature comprises one or a plurality of the following:
   a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

5. The method according to claim 1, wherein the paid service recommendation scheme comprises one or a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location.

6. A service recommendation apparatus, comprising:

   a feature acquisition module configured to acquire at least the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;
   a scheme acquisition module configured to input the acquired features into a recommendation scheme model, and acquire a paid service recommendation scheme for the target user output by the recommendation scheme model; and
   a recommendation module configured to perform paid service recommendation for the target user by using the paid service recommendation scheme.

7. The apparatus according to claim 6, wherein the recommendation module is specifically configured to output a paid recommendation entrance on a page where the target user uses the service.

8. The apparatus according to claim 6, wherein the use feature comprises one or a plurality of the following:
   a use time period feature, a use duration feature, a use frequency feature, a used storage space feature, or a used storage quantity feature.

9. The apparatus according to claim 6, wherein the service feature comprises one or a plurality of the following:
   a storage space feature, a folder quantity feature, a function type feature, a storage quantity feature, a total storage quantity feature, a computation unit peak feature, a total computation amount feature, a network download speed feature, a network upload speed feature, a total network download amount feature, or a total network upload amount feature.

10. The apparatus according to claim 6, wherein the paid service recommendation scheme comprises one or

a plurality of types of the following information: a paid service type, a recommendation frequency, a recommendation time, or a recommendation location.

11. A service recommendation device, comprising a memory, a processor, and a computer program stored in the memory and executable by the processor, wherein the processor implements the following method when executing the program:

acquiring at least the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user;
inputting the acquired features into a recommendation scheme model, and acquiring a paid service recommendation scheme for the target user output by the recommendation scheme model; and
performing paid service recommendation for the target user by using the paid service recommendation scheme.

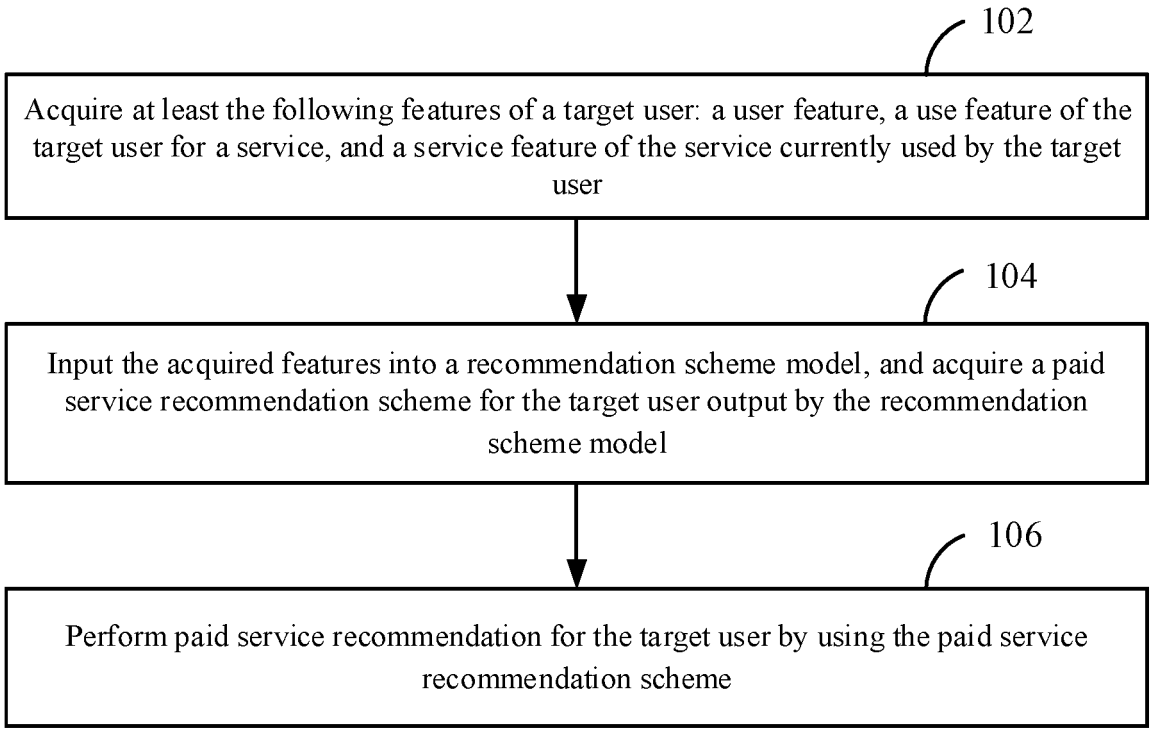
102
Acquire at least the following features of a target user: a user feature, a use feature of the target user for a service, and a service feature of the service currently used by the target user
104
Input the acquired features into a recommendation scheme model, and acquire a paid service recommendation scheme for the target user output by the recommendation scheme model
106
Perform paid service recommendation for the target user by using the paid service recommendation scheme

FIG. 1


Yuque
Discuss
Find
Help
Feedback
Lin
Wai
Edit profile
Following
1
Followers
8
Not filled
Not filled
Team
Knowledge base
Like
Following
Followers
Search in a knowledge base
Type: all
test003
Just now
test002
2 minutes ago
test 001
3 minutes ago
Upgrade to a Pro user and enjoy more knowledge bases

FIG. 2

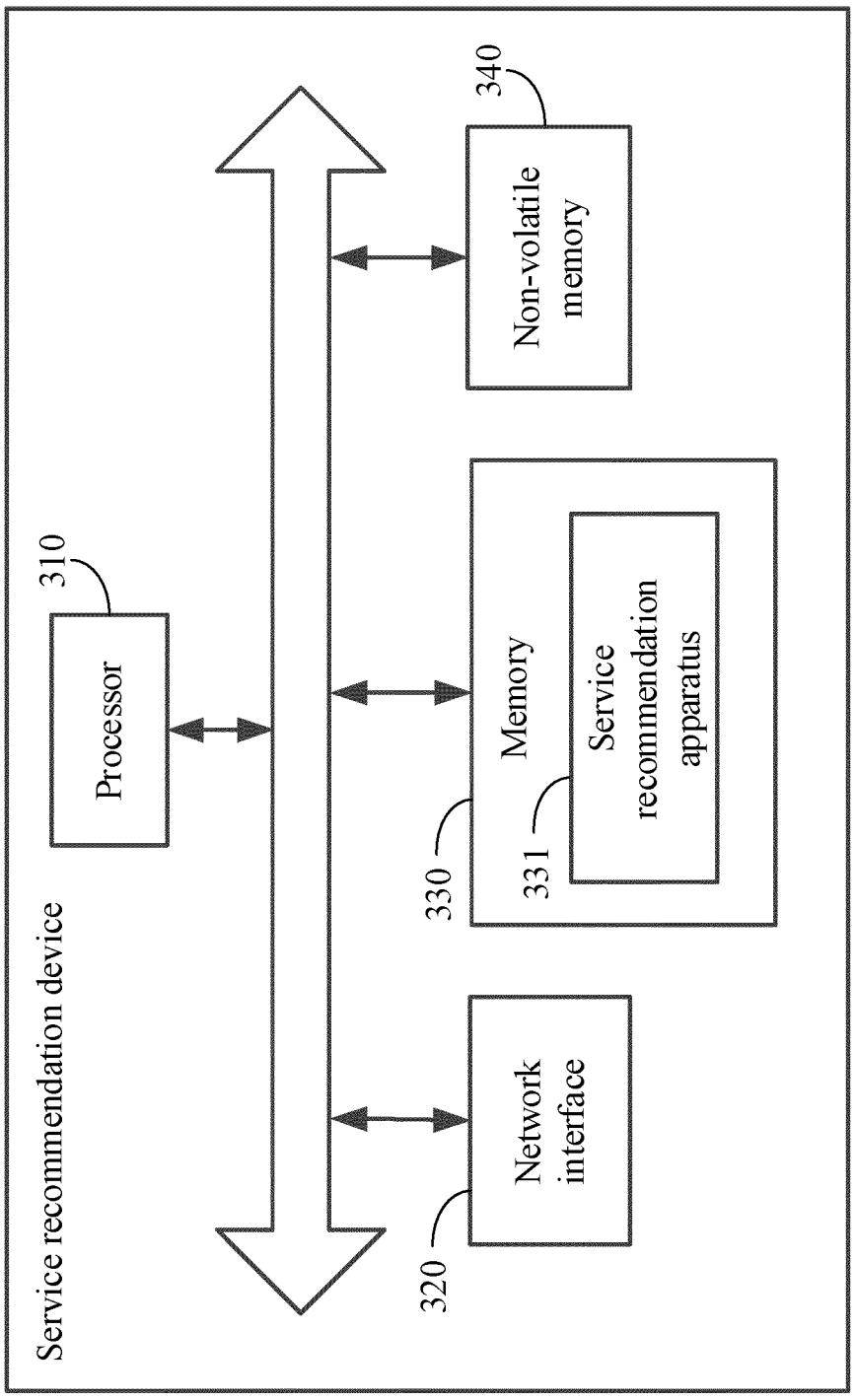
Service recommendation device
Processor
310
Memory
330
Service recommendation apparatus
331
Non-volatile memory
340
Network interface
320

FIG. 3

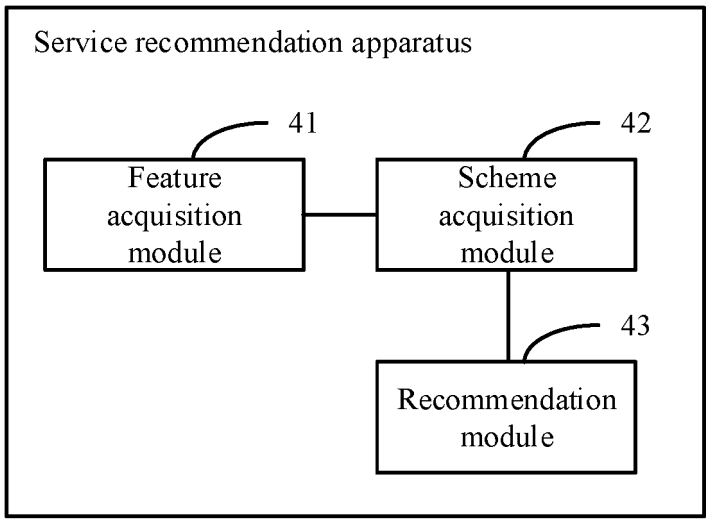
Service recommendation apparatus
41
42
Feature acquisition module
Scheme acquisition module
43
Recommendation module

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/099448

A. CLASSIFICATION OF SUBJECT MATTER

G06Q 30/06(2012.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06Q; G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT; WPI; EPODOC; CNKI; IEEE: 服务, 推荐, 推送, 信息, 特征, 用户, 使用, 模型, 频, 时间, 位置, 类型, service, recommend, push, information, characteristics, user, use, model, frequency, time, location, type

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109598576 A (ALIBABA GROUP HOLDING LIMITED) 09 April 2019 (2019-04-09) claims 1-11	1-11
X	CN 106294743 A (BEIJING QIHOO TECHNOLOGY CO., LTD. ET AL.) 04 January 2017 (2017-01-04) description, paragraphs [0035]-[0052] and [0078]	1-11
A	CN 103544623 A (WUHAN UNIVERSITY) 29 January 2014 (2014-01-29) entire document	1-11
A	CN 106682686 A (BEIJING TUOMING TECHNOLOGY CO., LTD.) 17 May 2017 (2017-05-17) entire document	1-11
A	US 2004153373 A1 (DOCOMO COMMUNICATIONS LABORATORIES USA, INC.) 05 August 2004 (2004-08-05) entire document	1-11

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
11 October 2019	**29 October 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/099448

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 109598576 A	09 April 2019	None	
CN 106294743 A	04 January 2017	None	
CN 103544623 A	29 January 2014	None	
CN 106682686 A	17 May 2017	None	
US 2004153373 A1	05 August 2004	None	

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